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(12) **United States Patent**
Wheeler et al.(10) **Patent No.:** US 6,534,484 B1
(45) **Date of Patent:** *Mar. 18, 2003(54) **METHODS FOR ENCAPSULATING PLASMIDS IN LIPID BILAYERS**(75) Inventors: **Jeffery J. Wheeler**, Richmond (CA); **Michael Hope**, Vancouver (CA); **Pieter R. Cullis**, Vancouver (CA); **Marcel B. Bally**, Bowen Island (CA)(73) Assignee: **Inex Pharmaceuticals Corp.**, Burnaby (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/436,933**(22) Filed: **Nov. 8, 1999****Related U.S. Application Data**

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(51) **Int. Cl.⁷** **A01N 43/04**(52) **U.S. Cl.** **514/44**; 264/4.3; 264/4.6; 424/450; 436/829; 514/55; 514/851(58) **Field of Search** 264/4.3, 4.6; 424/450; 436/829; 514/44, 851(56) **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Richard D. Lovering**(74) Attorney, Agent, or Firm**—Townsend & Townsend & Crew LLP(57) **ABSTRACT**

Plasmid-lipid particles which are useful for transfection of cells in vitro or in vivo are described. The particles can be formed using either detergent dialysis methods or methods which utilize organic solvents. The particles are typically 65–85 nm, fully encapsulate the plasmid and are serum-stable.

18 Claims, 18 Drawing Sheets